

What is claimed is:

- 1.** A method for estimating a location of a wireless terminal, said method comprising:

  - defining a rasterized footprint of a building, wherein said rasterized footprint comprises a plurality of rasters, and wherein said rasterized footprint has a boundary and an interior; and
  - estimating signal attenuation due to said building, wherein the estimate of signal attenuation is based on signal losses at a first group of said rasters, wherein said rasters in said first group define said boundary of said rasterized footprint.
- 2.** The method of claim 1 wherein estimating signal attenuation further comprises basing the estimate of signal attenuation on signal losses at a second group of said rasters, wherein said rasters in said second group define said interior of said rasterized footprint.
- 3.** The method of claim 2 further comprising determining a depth of said raster within said rasterized footprint,

  - wherein said depth of said raster is defined by a layer number,  $L$ ;
  - wherein rasters defining said boundary have a layer number,  $L=1$ ;
  - wherein rasters defining said interior have a layer number  $L = 2$  to  $n$ , wherein  $n$  is a positive integer; and
  - wherein signal attenuation at layer  $L = m$ , wherein  $m \geq 2$ , is based on the signal losses at layers  $L = 1$  through  $m - 1$ .
- 4.** The method of claim 1 wherein estimating signal attenuation further comprises accounting for an effect of building orientation with respect to a direction of signal propagation on signal losses at said first group of rasters.
- 5.** The method of claim 2 wherein estimating signal attenuation further comprises accounting for an effect of building orientation with respect to a direction of signal propagation on signal losses at said second group of rasters.
- 6.** The method of claim 4 wherein estimating signal attenuation further comprises accounting for an effect of building orientation with respect to a direction of signal propagation on signal losses at said second group of rasters.

**7.** The method of claim 2 further comprising developing a map from the estimate of signal attenuation, wherein said map associates location within said building with an indicator of signal attenuation.

**8.** The method of claim 7 further comprising using the signal-attenuation information from said map to adjust signal-strength estimates that are obtained from an outdoor radio frequency database.

**9.** The method of claim 8 further comprising:  
receiving a first signal-strength measurement for a first signal at said wireless terminal; and  
estimating the location of said wireless terminal by pattern matching a function of said first signal-strength measurement against the adjusted signal-strength estimates.

**10.** A method for estimating a location of a wireless terminal, said method comprising:  
defining a rasterized footprint of a building, wherein said rasterized footprint comprises a plurality of rasters, and wherein said rasterized footprint has a boundary and an interior, and further wherein rasters at said boundary of said rasterized footprint define a first group of rasters; and  
estimating signal attenuation due to said building, wherein the estimate of signal attenuation is based on signal losses in a second group of said rasters, wherein said rasters in said second group are in said interior of said rasterized footprint.

**11.** The method of 10 further comprising determining a depth of said raster within said interior of said rasterized footprint,  
wherein said depth of said raster is defined by a layer number,  $L$ ;  
wherein rasters defining said boundary have a layer number,  $L=1$ ;  
wherein rasters within said interior have a layer number  $L = 2$  to  $n$ , wherein  $n$  is a positive integer; and  
wherein signal attenuation experienced at layer  $L = m$ , wherein  $m \geq 2$ , is based on the signal losses at layers  $L = 1$  through  $m - 1$ .

**12.** The method of claim 10 wherein estimating signal attenuation further comprises accounting for an effect of building orientation with respect to a direction of signal propagation on signal losses at said second group of rasters.

**13.** The method of claim 10 further comprising adjusting signal-strength estimates obtained from an outdoor radio frequency database using the estimates of signal attenuation within said building.

**14.** The method of claim 13 further comprising receiving a first signal-strength measurement for a first signal at said wireless terminal; and  
estimating the location of said wireless terminal by pattern matching a function of said first signal-strength measurement against the adjusted signal-strength estimates.

**15.** A method for estimating a location of a wireless terminal, said method comprising:  
defining a rasterized footprint of a building, wherein said rasterized footprint comprises a plurality of rasters, and wherein said rasterized footprint has a boundary, an interior, and an exterior; and  
estimating signal attenuation due to said building, wherein the estimated signal attenuation is a function of an angle of incidence of a signal with respect to one or more physical features of said building, wherein said signal is transmitted from a transmitter.

**16.** The method of claim 15 wherein estimating signal attenuation further comprises estimating a surface vector of a raster at said boundary.

**17.** The method of claim 16 wherein said surface vector is estimated using at least one raster at said exterior of said raster footprint that is adjacent to said raster at said boundary.

**18.** The method of claim 16 wherein estimating signal attenuation further comprises estimating a signal vector of said raster at said boundary, wherein said signal vector points toward said transmitter from said raster.

**19.** The method of claim 18 wherein estimating signal attenuation further comprises determining a difference between said surface vector and said signal vector.

**20.** The method of claim 15 further comprising assigning an attenuation value to a raster at said boundary as a function of said angle of incidence of said signal.

**21.** A method for estimating a location of a wireless terminal, said method comprising:

defining a rasterized footprint of a building, wherein said rasterized footprint comprises a plurality of rasters, and wherein said rasterized footprint has a boundary, an interior, and an exterior; and

estimating signal attenuation due to said building, wherein the estimated signal attenuation is a function of signal losses that occur within said building, which losses are a function an angle of incidence of a signal with respect to said building, wherein said signal is transmitted from a transmitter.

**22.** The method of claim 21 wherein estimating signal attenuation further comprises estimating a surface vector of a raster within an interior of said raster footprint.

**23.** The method of claim 22 further comprising determining a depth of said raster within said interior;

wherein said depth of said raster is defined by a layer number,  $L$ ;

wherein rasters within said interior have a layer number  $L = 2$  to  $n$ , wherein  $n$  is a positive integer; and

wherein said surface vector of a raster at layer  $L = m$ , where  $2 \leq m \leq n$ , is estimated using at least one raster at layer  $L = m-1$  that is adjacent to said raster at layer  $L = m$ .

**24.** The method of claim 22 wherein estimating signal attenuation further comprises estimating a signal vector of said raster within said interior, wherein said signal vector points toward said transmitter from said raster.

**25.** The method of claim 24 wherein estimating signal attenuation further comprises determining a difference between said surface vector and said signal vector.

**26.** The method of claim 21 further comprising assigning an attenuation value to a raster at said boundary as a function of said angle of incidence of said signal.

**27.** A method for estimating a location of a wireless terminal, said method comprising:

accessing an outdoor radio frequency database, wherein said outdoor radio frequency database provides signal strength as a function of location; and

modifying said signal strength, as provided by said outdoor radio frequency database, with signal-attenuation values from an indoor radio frequency database, wherein said indoor radio frequency database provides signal attenuation as a function of location within a structure.

**28.** The method of claim 27 further comprising:

receiving a first signal-strength measurement for a first signal at said wireless terminal; and

estimating the location of said wireless terminal by pattern matching a function of said first signal-strength measurement against signal-strength data from said outdoor radio frequency database, as modified by said indoor radio frequency database.

**29.** The method of claim 27 wherein said signal-attenuation values from said indoor radio frequency database are orientation-independent.

**30.** The method of claim 27 wherein said signal-attenuation values from said indoor radio frequency database are orientation-dependent.